

PROJECT NUMBER: 1758
PROJECT TITLE : Tobacco Cell Wall Research
PROJECT LEADER: Gordon H. Bokelman
PERIOD COVERED: August, 1984

I. TOBACCO STALK PITH (Howard Sun and Gordon Bokelman)

For the purpose of biological testing, tobacco sheets were prepared from both bright and burley 1983 lyophilized stalk pith. The bright sheet contained 100% stalk pith, but it was necessary to add 2% citrus pectin as a binder to the burley stalk pith.

On August 2, one hundred field-grown burley stalks were defoliated, harvested, cut into -1 inch sections and frozen at the V.P.I. & S.U. Southern Piedmont Research and Continuing Education Center in Blackstone, VA , for further processing at Philip Morris.

II. BLEND COMPOSITION ANALYSIS (Howard Sun, Jack Stimler and Gordon Bokelman)

With the new tobacco data base, the following correlation coefficients were found for DBC burley content: free aspartic acid - 0.98 and free glutamic acid - 0.92. The consistency of free aspartic acid as a predictor is being evaluated using different batches of DBC burley.

The fact that the best predictors for burley are low molecular weight acids (citric, aspartic and glutamic) raises the intriguing possibility that burley's unique pharmacognosy may define it as a distinct chemical race.

III. INSTRUMENTATION (Bill Ryan)

A new Hewlett-Packard 5880 A gas chromatograph was received and installed. This instrument has electronic flow control (EFC) of the split/splitless injection port. With EFC, it is possible to rapidly establish appropriate column head pressures and split ratios. The use of this feature to program column head pressure during a gc run and thus improve the separation by decreasing retention time and/or improving peak shape is being investigated.

IV. STRUCTURAL STUDY OF TOBACCO PECTIN (Howard Sun)

A pectin isolated from E-55 bright tobacco was converted to a neutral polysaccharide by reduction with sodium borodeuteride in the presence of 1-cyclohexyl-3-(2-morpholinoethyl)-carbodiimide metho-p-toluenesulfonate. The reduced pectin contained 78.8% galactose, 14.8% rhamnose and 6.4% arabinose as determined by gc quantitation after methanolysis and silylation. The increase in rhamnose and arabinose contents (compared to starting material) clearly indicates that a significant amount of galacturonic acid was degraded during the reduction. However, this neutral polysaccharide should be suitable for determination of the neutral sugar linkage patterns following partial acid hydrolysis.

V. ACID-DETERGENT RESIDUE DETERMINATIONS (Gordon Bokelman)

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Acid-detergent residue analyses were performed on a number of bright and burley tobacco samples at the request of Betty Handy. This procedure was seen

to give reproducible results. However, interpretation of the values obtained was more meaningful for freeze-dried rather than cured tobacco samples. This is a reflection of the fact that tobacco proteins undergo complex condensation reactions during curing to form insoluble products.

VI. MISCELLANEOUS

1. Memo to Laura McCray from Gordon H. Bokelman, "Pectin in Dust Samples from the BL Plant", dated August 13, 1984.
2. Memo to Dr. R. H. Cox from G. H. Bokelman, "1984 Annual Meeting of the American Society of Plant Physiologists", dated September 4, 1984.

Gordon H. Bokelman

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